

Work Order ID 146188

Tuesday, May 10, 2016 4:01:37 PM

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Item ID: D412-664-203

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: Aft Crosstube - High

Start Date: 5/10/2016 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 6/3/2016 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: CMF Date: 16-5-10 Tooling: _____ Date: _____Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D412-664-243	F								
100	Document Control	0.00							
100	DOCUMENT CONTROL								
DC	Memo	0.00							
Doc.Control -USB or Paperwork	Photocopy bluefile and create labels as per PPP D412-664-203 CHG 010								
110	Packaging	0.00							
110									
Packaging	Memo	3.20							
Packaging									
120	BENDING MACHINE - CROSSTUBES	0.28							
120									
CNC Bend 2	Memo	1.04							
CNC Alpha 160 Bender	Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and Folio FT010								

D412-664-203/146188

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Start Date: 5/10/2016 Start Qty: 1.00

1

Cust Item ID:

Required Date: 6/3/2016 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00							
130									
QC	Memo	0.00							DAS 38 9-89
Quality Control									MAY 12 2016
140		0.02							
140	Crosstubes								
Crosstubes	Memo	1.29							
Crosstubes	1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551 and drill table DT8577 using #9 holes as per QSI 10 to install towers.								
	2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.								
	3-SCRIBE PART # & BATCH # ACCORDING TO NOTE 6								
	4- *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243								

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Cust Item ID:

Required Date: 6/3/2016 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

160

0.00

160

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

IMMEDIATELY AFTER GRINDING

1- PRESSURE WASH X-TUBE INSIDE AND OUT

2- ALODINE AND ACID ETCH X-TUBE INSIDE AND OUT AS PER QSI005.

TW 16-05-12

165

QC7-Inspect Chemical Conversion Coat

0.00

165

QC

Memo

0.01

Quality Control

DAS
38
9-89*1* _____ **MAY 24 2016**

170

QC5- Inspect part completeness to step on W/O

0.00

170

QC

Memo

0.02

Quality Control

INSPECT ENGRAVING AND BATCH # *3146188*DAS
38
9-89*1* _____ **MAY 24 2016**

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Required Date: 6/3/2016 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 *180* Outsource2 Outsource process - NDT	Outsource process - NDT per QSI038 4.1 Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Liquid Penetrant Inspection as per QSI 038Or Issue P/O <u>32491</u> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order	0.00 180.00				1		MAY 27 2016	DAS 13 9-89
190 *190* Packaging Packaging	Packaging <i>Receiving</i> Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Inspect for transit damage Ensure copy of NDT results attached to work order.	0.00 0.00				1		MAY 27 2016	DAS 13 9-89
200 *200* QC Quality Control	QC5- Inspect part completeness to step on W/O Memo *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Inspect for damage & ensure results are as per Dwg D412-664-203	0.00 0.02				1			DAS 38 9-89 MAY 31 2016

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Setup Start *NS1*

Stop *NS2*

Cust Item ID:

Customer:

Reference:

Run Start *NR1*

Stop *NR2*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

210

210

SprayPaint

Spray Painting

SprayPaint

Set Up/
Run Hours

0.00

0.48

Tool ID	Tool #	Plan Code
---------	--------	-----------

**Accept
Qty**

Reject
Qty

Reject Number

**Insp.
Stamp**

DAS

41

9-89

16-5-31

Memo

*** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

VERIFY BY **DAS BATCH # TO MATCH W/O

***VERIFY BY **41** PART # TO MATCH

W/O 9.89

MASK SCRIBE B# & P# AND VERIFY

Mask underside of crosstube as shown

1-Prime inside and outside crosstube as per QSI 005 4.2 AND DWG

PRIMER: 134454

START TIME: 1000

FINISH TIME: 1100

2-Paint outside crosstube with White Imron as per DWG D412-664-243 and QSI 005 4.2

PAINT: ~~133594~~ 134585

Start Time: 300

Finish Time: 400

3- Apply clear coat after paint as per DWG

133641

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Item Name: Aft Crosstube - High

Start Date: 5/10/2016 Start Qty: 1.00

1

Cust Item ID:

Required Date: 6/3/2016 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
220	QC14- Inspect Spray Paint	0.00							
220									
QC	Memo	0.01							DAS
Quality Control	Then, Wrap in plastic bag to protect from scratches								9-89

① 16-07-06

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Start Date: 5/10/2016 Start Qty: 1.00 ***1***

Cust Item ID:

Required Date: 6/3/2016 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp DAS
230		0.00							
230	Crosstubes					1			41
Crosstubes		1.28							9-89
Crosstubes	Memo								16-6-23

Assemble as per Dwg D412-664-203

1- Install center support using scoth-weld DP460 per QSI 015, as per DWG. note 13. Install supports clamps using as per Dwg D412-644-243. Install clamp with rubber cushion as per DWG. note 14. ***ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT*** Torque clamps on support to 80-100 IN-LBS AS PER DWG.

A/R scoth-weld DP460 BATCH #: 132504
EXP DATE: 8/16

2- **IF NOT ALREADY PRESENT ON CHAFFING SHEILD.** Apply a thin coat of proseal 890 per QSI 015 on inside concave surface of chafing shield and let cure per manufacturer's instructions. Install prosealed chafing shield onto crosstube by applying a thin coat of proseal 890 onto crosstube. Be sure to eliminate any air gaps. Install and torque clamps on chafing shield to 40-50 IN-LBS AS PER DWG.

A/R Proseal 890 Batch: 134500
EXP DATE: 11/16

AFTER FINISH CURE TIME 24H
START CURE TIME: 16-6-23
FINISH CURE TIME: 16-6-24

PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER
CURED FOR 24H.

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Start Date: 5/10/2016 Start Qty: 1.00

1

Cust Item ID:

Required Date: 6/3/2016 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

240

QC5- Inspect part completeness to step on W/O

0.00

240

QC

Memo

0.02

Quality Control

***RE-CHECK TORCQUE ON CLAMP AFTER PROSEAL HAS CURED
FOR 24HOURS AS PER DWG.***

0 1607-06 DAS
9 9-89

250

Pick Kit

0.00

250

Packaging

Memo

0.00

Packaging

DAS 6 DAS
9-89 28 MAY 27 2016
9-89

260

QC4- 100% Inspect kits for completeness

0.00

260

QC

Memo

0.03

Quality Control

DAS 27
9-89

JUL 06 2016

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Item Name: Aft Crosstube - High

Start Date: 5/10/2016 Start Qty: 1.00

1

Cust Item ID:

Required Date: 6/3/2016 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
270		0.00							
270	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D412-664-203 *****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date ***** Time & date of packaging: _____ Location: _____								
280	QC21- Final Inspection - Work Order Release	0.00							
280									
QC	Memo	0.10							
Quality Control									

DAS
28
9-89DAS
27
9-89

JUL 08 2016

16/7/12 JF
Em 16/07/08

Picklist Print

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Work Order ID: 146188

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Parent Item: D412-664-203

D412-664-203

Parent Item Name: Aft Crosstube - High

Start Date: 5/10/2016

Required Date: 6/3/2016

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:E04.02.16Reformat; Added D3189-1K/DS
 IPP Rev:F 06-03-29 Remove Coments on Pick List JLM
 IPP Rev:G 06.12.08 per ECN 886 EC
 IPP Rev:H 07-04-30 As per Rev D JLM
 IPP Rev:I 08-06-12 add comment in seq. 21 DD verified by:EC IPP rev J
 11.04.21 DEO D412-664-243-E-1 EC verified DD IPP REV:K
 11.10.03 DEO D412-664-243-E-2 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
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AN6-40A		Purchased	No			250	Each	46.0000	4	4			
AN6-40A 3/8-24 BOLT,X 3"LONG													
DAS 27 9-89 Location ST333 M133316 M133769 M134509 Loc Qty 46 18 8 20 Loc Code 4													
DAS 28 9-89 9-89													

AN6-41A		Purchased	No			250	Each	33.0000	2	2			
AN6-41A Bolt													
DAS 27 9-89 Location ST286A M129913 ST333 M133577 M134508 Loc Qty 1 1 32 12 20 Loc Code 2													
DAS 28 9-89 9-89													

MAY 27 2016

D2896-1		Manufactured	No			230	Each	2.0000	1	1			
D2896-1 Support													
DAS 41 9-89 Location LG051 134290 Loc Qty 2 2 Loc Code 1													
DAS 41 9-89 16-6-23													

Picklist Print

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Work Order ID: 146188

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Parent Item: D412-664-203

D412-664-203

Parent Item Name: Aft Crosstube - High

Start Date: 5/10/2016

Required Date: 6/3/2016

Start Qty: 1.00

Required Qty: 1.00

D3189-1 Manufactured No

230

Each

3.0000

2

2

DAS

D3189-1

Chaffing Shield

**

41

9.89

16-6-23

Location

Loc Qty

Loc Code

LG051

3

145416

3

143836

D3595-063-570 Manufactured No

230

Each

55.0000

2

2

DAS

D3595-063-570

Rubber Cushion 0.63" wide x 5.70" Long

**

41

9.89

16-6-23

Location

Loc Qty

Loc Code

FG

8

42243

8

LG052

47

144834

47

2

D412-664-203TRN Manufactured No

110

Each

4.0000

1

1

D412-664-203TRN

Crosstube Turning Detail

**

Location

Loc Qty

Loc Code

LG014

4

144119

1

144120

1

144121

1

144122

1

① JW 16-05-11

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Parent Item: D412-664-203

D412-664-203

Parent Item Name: Aft Crosstube - High

Start Date: 5/10/2016

Required Date: 6/3/2016

Start Qty: 1.00

Required Qty: 1.00

MS21042L6

Purchased

No

250

Each

275.0000

6

6

MS21042L6

Nut

DAS
27
9-89

Location

Loc Qty

Loc Code

ST303

275

m133938

6

m134055

19

m134509

100

m134567

50

m134676

100

DAS
28
9-89

MAY 27 2016

MS21920-28

Purchased

No

230

Each

45.0000

4

4

MS21920-28

Clamp

135007

Location

Loc Qty

Loc Code

FG

1

105884

1

LG051

1

M132169

1

LG057

43

M134130

2

M134514

3

M134590

38

DAS
41
9-89

16-6-23

MS21920-30

Purchased

No

230

Each

30.0000

2

2

MS21920-30

Clamp

Location

Loc Qty

Loc Code

LG57

30

m131689

10

m134257

20

2

Picklist Print

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Parent Item: D412-664-203

D412-664-203

Parent Item Name: Aft Crosstube - High

Start Date: 5/10/2016

Required Date: 6/3/2016

Start Qty: 1.00

Required Qty: 1.00

NAS1149D0663J

Purchased

No

250

Each

870.0000

18

18

NAS1149D0663.J

Washer

**

68-6

28

SVD

D46

6

9-89

Location

Loc Qty

Loc Code

ST260

227

M131618

227

ST263

592

M133134

89

M133769

12

M133812

6

M134634

485

ST269

51

M126334

51

MAY 27 2016

18

DAS
27
9-89

Item	Qty -243	Part Number	Description
1	X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	A/R	PROSEAL 890 B-2	SEALANT

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART P/N "D412-664-243" AND B/N ON INSIDE OF CUFF PER QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 47.0 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. DO NOT GRIND TUBE AFTER SHOT PEEN.

TURNING

- 10) WHEN TRANSITIONING TO STOCK MAT'L, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R30 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 12) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.

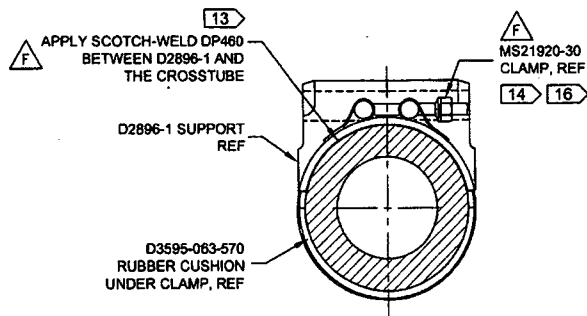
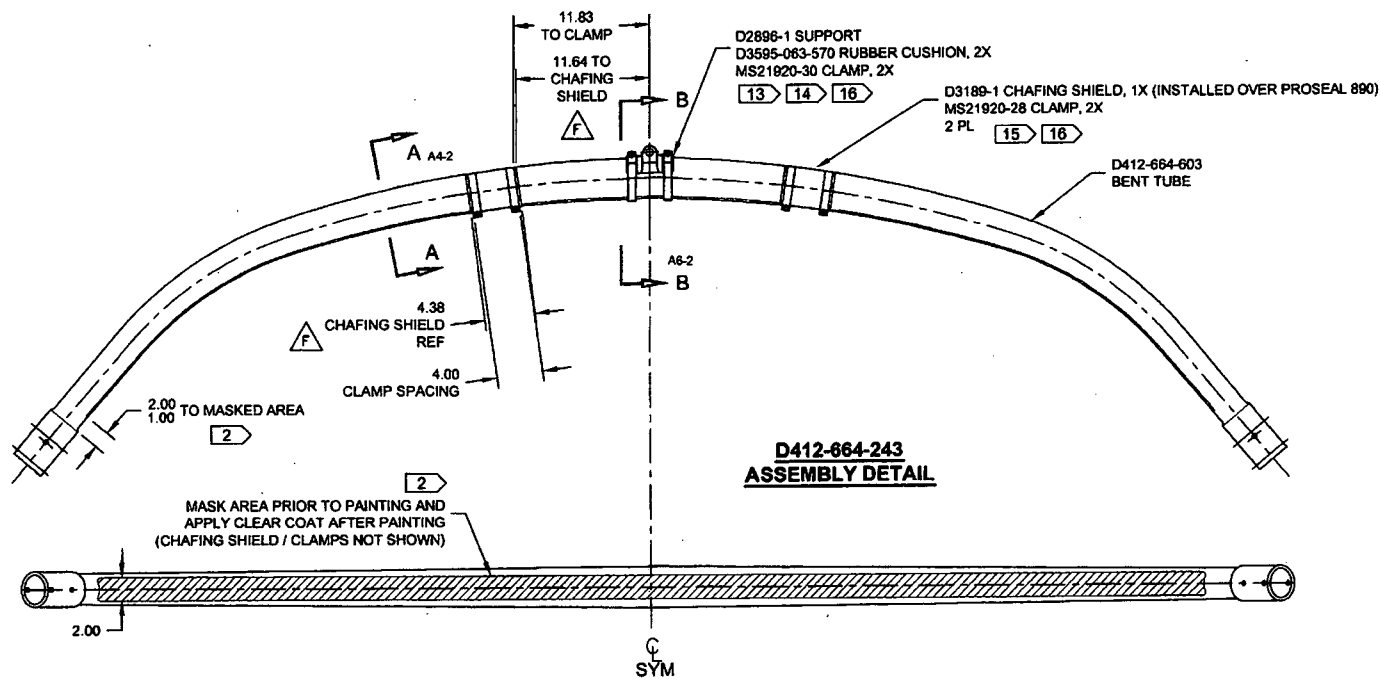
ASSEMBLY

- 13) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015.
- 14) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- 15) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 16) TORQUE CLAMPS ON D2896-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D3189-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

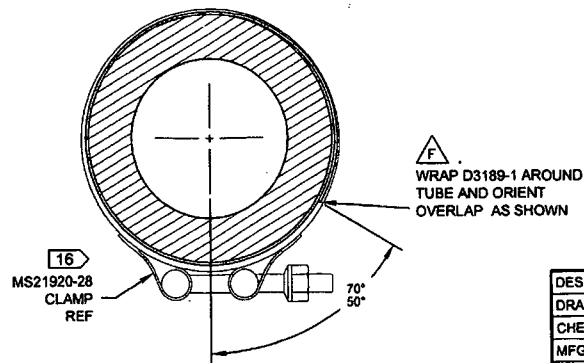
mf
#146188

RELEASED
2014-05-26

F	NOTES RE-ORDERED, SCOTCH-WELD WAS MAGNOBOND (C8-1), ADD CLAMP RETORQUE (A8-1), REMOVE ABRASION STRIP, ADD INSPECTION WINDOW (C8-1), CHAFING SHIELD NOW 4.38 WIDE (C8-2), ADD 7% CRUSHING (B8-1), CHG BEND HEIGHT TOL. TO ±0.25 (C1-3), CHG CUFF TOL. (D2-4), CLAMPS FLIPPED TO PREVENT CHAFING (B7-2, B7-3), INCORP. DEO E-2-4	CP	14.04.01
E	REFORMAT/REVISE GENERAL NOTES: REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS: RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
C	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398, MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>DP</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	<i>DP</i>		
CHECKED	<i>DW</i>	DRAWING NO.	REV. F
MFG. APPR.	<i>DP</i>	D412-664-243	SHEET 1 OF 4
APPROVED	<i>DP</i>	TITLE	SCALE
DE APPR.	<i>DP</i>	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2001 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS UNDERSTANDING THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



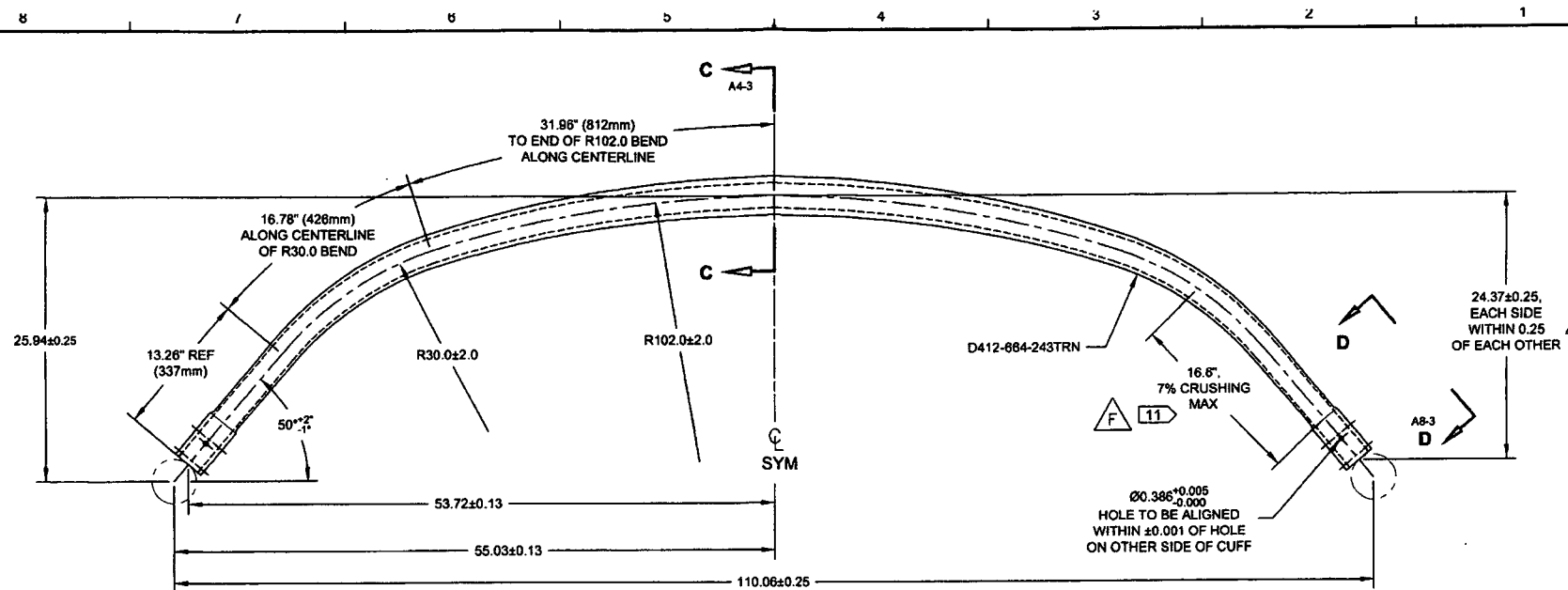
SECTION B-B D4-2
SCALE 4X



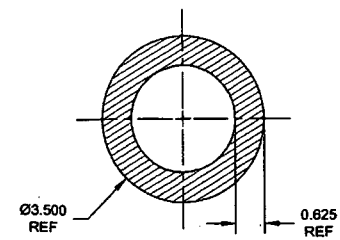
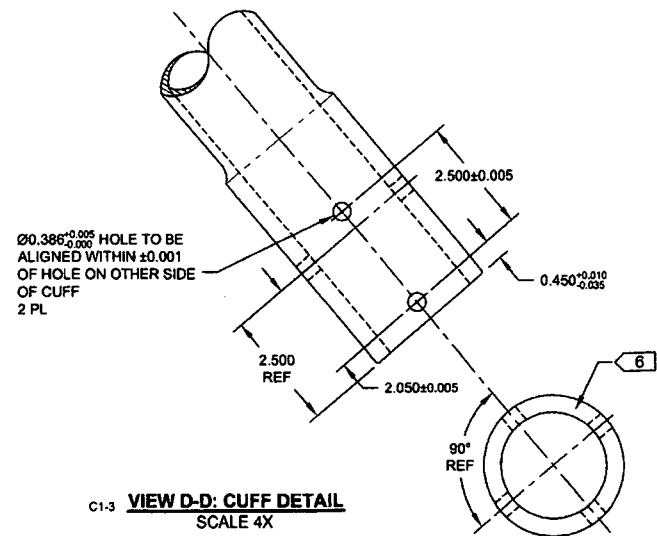
SECTION A-A D6-2
SCALE 6X

RELEASED
2014-05-26
ND

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. F
MFG. APPR.		D412-664-243	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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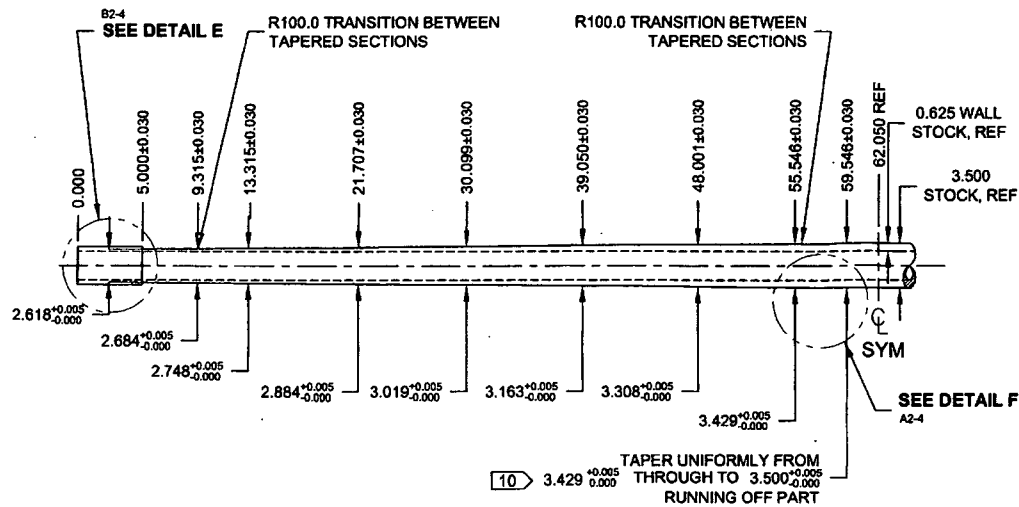


D412-664-603
BENDING AND DRILLING DETAIL

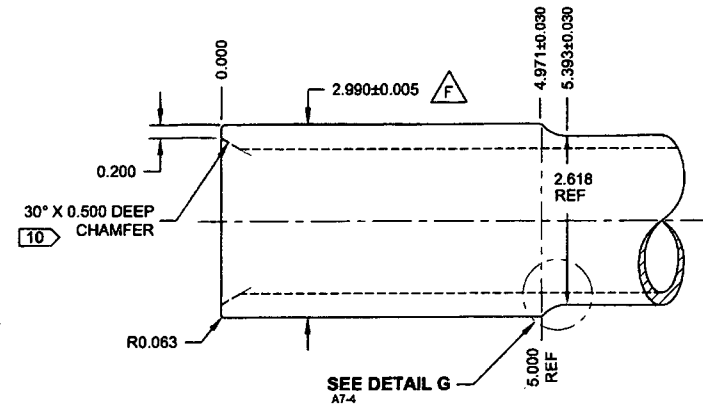


RELEASED
2014-05-26

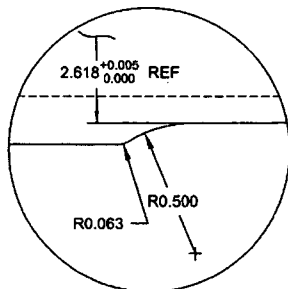
DESIGN	9	DART AEROSPACE LTD	
DRAWN	DW	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. F
MFG. APPR.		D412-664-243	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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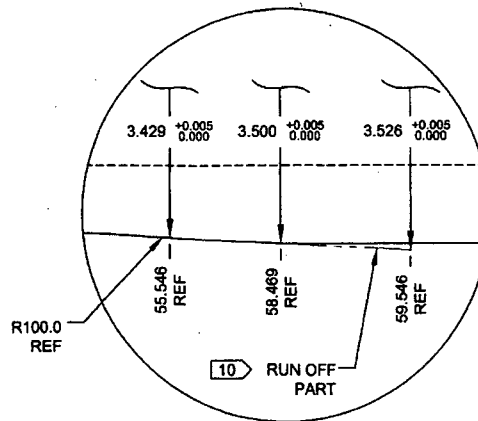
D412-664-243TRN
TURNING DETAIL



DETAIL E:
CROSSTUBE CUFF
SCALE 5X



DETAIL G:
CUFF TRANSITION
SCALE 10X



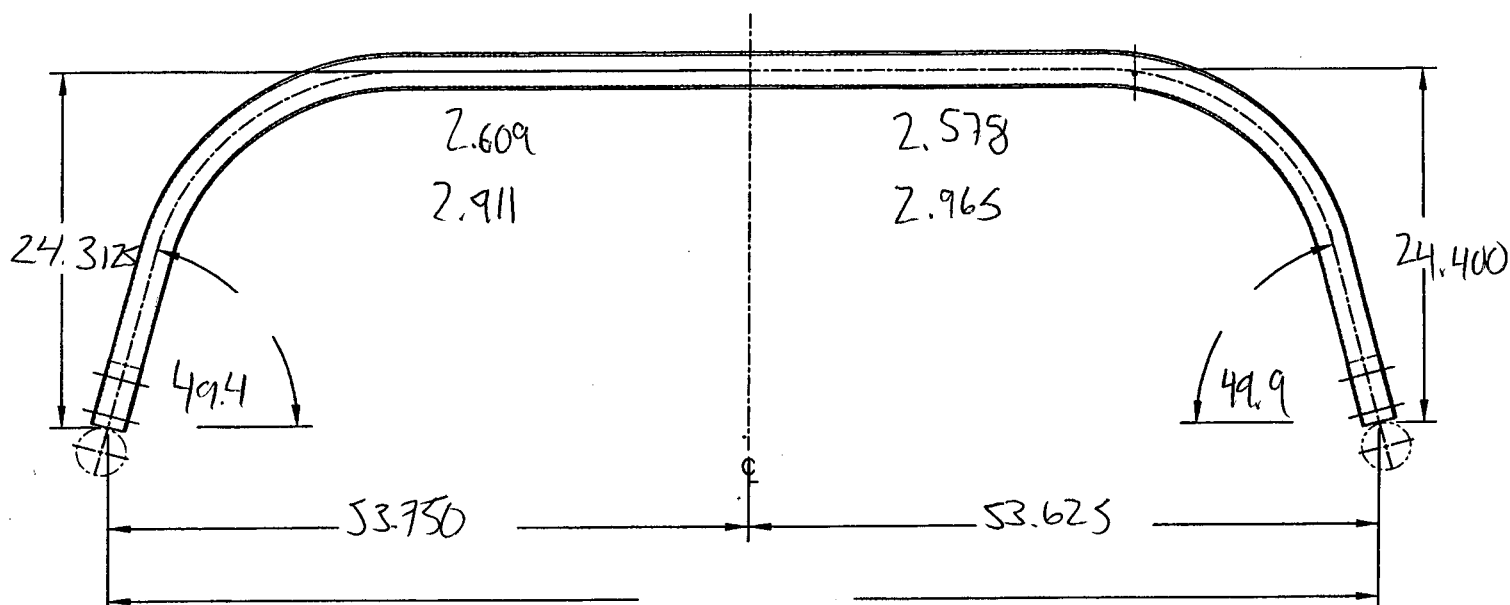
DETAIL F:
TAPER RUN-OFF
NOT TO SCALE

RELEASED
2014-05-26

DESIGN	92	DART AEROSPACE LTD	
DRAWN	92	HAWKESBURY, ONTARIO, CANADA	
CHECKED	SW	DRAWING NO.	REV. F
MFG. APPR.	SW	D412-664-243	SHEET 4 OF 4
APPROVED	SW	TITLE	SCALE
DE APPR.	SW	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
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DART AEROSPACE LTD		Work Order:	146/88
Description: Crosstube High Aft (412)		Part Number:	D412-664-203
Inspection Dwg: D412-664-243 Rev: F		Page 1 of 1	

Required Dimension	Min	Max
Height	24.12	24.62
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70
Bending Passes	8	--
Crushing	--	7%



	Side A	Side B
Bending Passes	17	14
Crushing	5.5%	7%
Comments		

QC15 Inspection		DAS
Date		38
		MAY 12 2016

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	
C	10.02.02	Dwg Rev updated	KJ	
D	12.04.16	Added bending, crushing dimensions	KJ	
E	14.09.08	Max crushing % revised	KJ	

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐																																																													
Date : _____		Step #: _____		QTY Effective : _____			MRB (QS1042) Approval																																																										
Description Work Order Deviation				Disposition				Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval																																																									
Root Cause		FAULT CATEGORY																																																															
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐	Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐	Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐	Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐	Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐	Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐	Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐	Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐	LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐	Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐	Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____			
Misidentified ☐	Past Due ☐																																																																



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO32491**

Purchase Order Date 5/26/2016

PO Print Date 5/27/2016

Page Number 2 of 3

Order From :

VC-SKY001

SKYSERVICE
6120 MIDFIELD ROAD
MISSISSAUGA, ONTARIO L5P 1B1
CANADA

Ship To : DART AEROSPACE LTD

1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name

Vendor Phone 905-678-5636

Ship To Contact

Ship To Phone

Ship Via: Delivered

Ship Acct:

Buyer

Chantal Lavoie

Customer POID

Customer Tax #

10127-2607

Terms

Net 30

Currency

CAD

FOB

FCA - (Free Carrier)

Line Total: \$0.00

3	146186	D412-664-203 CROSSTUBE	5/26/2016	1.00	\$0.00	\$0.00
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Yes
5/26/2016

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR
LPI AS PER ASTM 1417 LEVEL 2

Line Total: \$0.00

4	146187	D412-664-203 CROSSTUBE	5/26/2016	1.00	\$0.00	\$0.00
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Yes
5/26/2016

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR
LPI AS PER ASTM 1417 LEVEL 2

Line Total: \$0.00

5	146188	D412-664-203 CROSSTUBE	5/26/2016	1.00	\$0.00	\$0.00
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Yes
5/26/2016

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR
LPI AS PER ASTM 1417 LEVEL 2

DAS
13
9-89

MAY 27 2016

Note:

5/27/2016



skyservice Work Order Traveler

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

WO #: MWO28366	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 32491
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT ON 4 CROSSTUBES AS PER PO32491

4 AFT CROSSTUBES, ITEM ID# D412-664-203 , WORK ORDERS ID# 145694, 146186, 146187, 146188

Action Taken:						Date:	Initial/Stamp:
LPI C/O IAW ASTM E-1417M-13 ***NO CRACK FOUND*** PEN. ZL-56, MPO13600, UV M-20141, CLEANER SKC-S MPO13923 , DEV. MPO11715						MAY 2 6 2016	
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	
		DAS 13 9-89					
		MAY 2 7 2016					

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature:	ACA/SCA Stamp	Date:
Name: RAFIK MELIKIAN		MAY 2 6 2016

Work Order ID 146188

Tuesday, May 10, 2016 4:01:37 PM

146188

Page 1

Item ID: D412-664-203

Accept

N900040100

Setup Start *NS1*

Revision ID:

Item Name: Aft Crosstube - High

Stop *NS2*

Start Date: 5/10/2016 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 6/3/2016 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals:

Process Plan: W/FDate: 16-5-10

Tooling:

Date:

Run Start *NR1*

QC:

Date:

SPC (Y/N):

Date:

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr

Revision Nbr

D412-664-243

F

0.00
6

MAY 27 2016

100

Document Control

100

DC

DOCUMENT CONTROL

Memo

0.00

Doc. Control - USB or Paperwork

Photocopy bluefile and create labels as per PPP D412-664-203 CHC 010

MCS

MAY 30 2016

110

Packaging

0.00

110

Packaging

Memo

3.20

Packaging

TW

16-05-12

120

BENDING MACHINE - CROSSTUBES

0.28

120

CNC Bend 2

Memo

1.04

CNC Alpha 160 Bender

Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and Folio FT010

TW

16-05-12